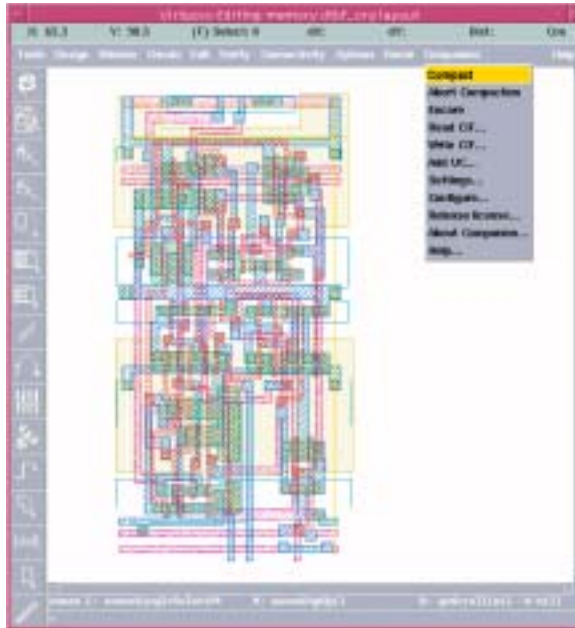


Companion™

Accelerate Your Full Custom Layout Design by 2X – 10X!

Reduce your full custom layout design time. Rapidly create design-rule correct and optimized cell layout from rough and preliminary layout. Produce design rule correct, area-optimized layout at the touch of a button.

**Features**

- Supports top-down or bottom-up design flows
- Automatic pitch-matching to pre-designed abutting cells
- Device sizes directly enforced from up-stream design data
- Automatic grid adherence for routing terminals
- Preserves all design properties such as pin names, connectivity and text labels
- Preserves Cadence's paths, Pcells, and RODs
- Automatically applies complex design rules for deep sub-micron technologies
- Visual critical dimensions feedback indicates congested areas and the constraining elements
- Automatic optimal contact strapping for devices and well/substrate taps

Benefits

- Accelerate the layout design process for memory, datapath, control logic, I/Os, and cell library
- Increase layout productivity by 2X – 10X
- Virtually eliminate DRC runs & significantly decrease LVS iterations
- Eliminate excessive polygon pushing – automatically compacts design to densest possible layout
- Leverage investment in existing design environment through seamless integration with Cadence Design Systems' Virtuoso®/Virtuoso® XL Layout Editor

Overview

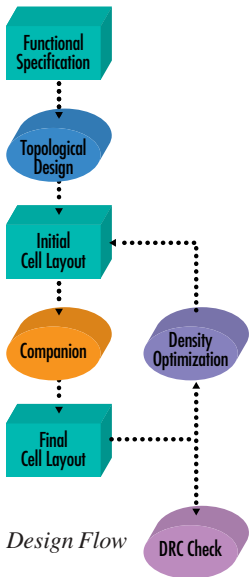
Companion accelerates the interactive design creation or migration of full custom layout by combining the design expertise and skills of the layout designer with the power of Sagantec's compaction technology within the Cadence Design Systems' Virtuoso® layout environment. Working in this environment, the layout designer can concentrate on getting a good architecture, placement and routing instead of measuring distances and trying to manually handle and satisfy all the complex rules of today's advanced technologies. These more mechanical and laborious tasks are left off for Companion. It will take the tedious task to fix all DRC violations in the layout and provide valuable layout-critical dimension feedback. The integration and ease-of-use of Companion enable designers to focus on creating optimal full custom layout and accomplish a quality result, fast.

Companion

Enhanced Productivity

When the Companion's 'compact' button in the Virtuoso® menu bar is pressed, the layout being edited is instantly compacted to the smallest possible area, while still conforming to the design rules of the fabrication technology. The layout is also instantly cleaned-up of all DRC violations, and congested areas that limit the layout's dimensions are highlighted. With Companion, physical layout designers can create design rule correct, optimal complex full custom layouts in a few hours instead of several days.

Companion significantly enhances the productivity of layout designers by allowing them to focus on creating denser layouts without concern for design rule violations. Layout designers that have used Companion report immediate layout productivity increase ranging from 2X to 10X, and layout cell area decrease by 5% to 15%. These benefits become even more pronounced at deep sub-micron technologies (line width of 0.18 micron and smaller) where significantly more effort is required to accomplish a dense and correct layout in a reasonable time frame.



Design Flow

*Companion compacted layout:
Optimized area, contact strapping and 45° compaction, while maintaining topology, hierarchy and all object types.*



Optimal Layouts

The full custom layout designer can quickly create a rough and loose, preliminary place and route layout in Virtuoso®, and then hit the 'compact' button. Companion examines the preliminary layout and further compacts polygon edges, using Sagantec's polygon edge repositioning to render the placed and routed elements into an optimized physical design. In addition, Companion guides the designer to a denser layout by pointing out congested areas in the compacted layout. The result is a more optimal layout than can be achieved without numerous manual iterations.

Companion can be used effectively to design full-custom blocks, custom or standard cells and memory cells, as well as macro blocks. Leaf cells can be constructed completely from scratch, or they can be drawn by migrating and modifying a previously designed database.

Companion Applications

- Memory cells and generators with automatic pitch-matching,
- High-performance/low-power full-custom logic blocks,
- Mixed-signal blocks
- Standard cell libraries
- I/O cells

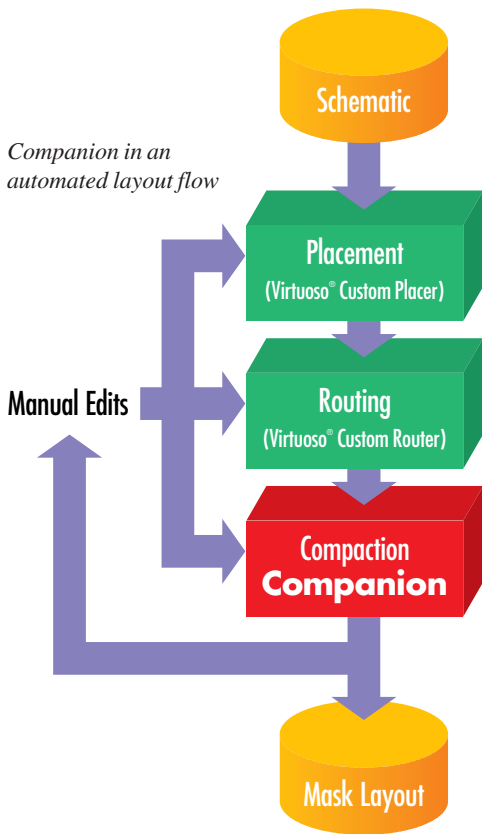
Unlike some traditional symbolic layout compaction tools that cannot read and handle existing, polygon-based layout databases, Companion has no such limitation. The direct interface of Companion to the Design Framework II database ensures that all physical design properties, such as pin names, connectivity or text labels, are preserved. This makes Companion a highly versatile and integrated solution, with unique capabilities for creation of new, as well as modification and migration of existing, full custom layout.

Full Designer Control

For the creation of memory, datapath and standard cell libraries, designers can specify abutment relations for neighboring cells that are already present in the Design Framework II database. Pitch matching requirements for these cells are automatically maintained. Device sizes for each transistor can be directly read from the schematic corresponding to that layout.

Designers can exert full control over final layout by manually inserting spacing requirements and transistor W/L values to override design rules and schematic values. Companion can work directly on polygon-level layouts but can also preserve higher-level constructs such as subcells that can be handcrafted, or generated by Pcells and RODs and also maintain connectivity information for the Virtuoso® Custom Router. Sub-cell preservation allows optimal compaction while maintaining the design hierarchy.

With the advent of recent automatic place & route flows for interactive custom layout, in many cases the router requires additional space to complete all connections. In such a flow Companion is used to compact the layout after routing and thus gain up to 20% of area. Additional features like path handling, support of net-dependent rules, window-compaction, and keepout areas make it easy to use these automatic place & route environments such as the Virtuoso® Custom Designer. With this flow Companion complements existing design methodology for full custom layout while significantly improving layout productivity.



Sagantec's Companion is compatible with the following third party software:

- Cadence Virtuoso® version 4.4.x and higher

Supported Platforms:

- Sagantec tools run on Solaris 2.5/2.6/7/8 and HP-UX 11.

For updates on software compatibility and supported platforms, check on the web at: www.sagantec.com

Sagantec
North America, Inc.
46485 Landings Parkway
Fremont, CA 94538
Tel: 510 360-5200
Fax: 510 360-5255

Sagantec Israel Ltd.
8, Hayozma Street
P.O. Box 117
Tirat-Carmel, Israel 39100
Tel: (+972) 4 857 2781
Fax: (+972) 4 857 2848

Sagantec Netherlands
Eindhoven Towers, 4th Floor
5611 CA Eindhoven
P.O. Box 2102
5600 CC Eindhoven
Tel: (+31) 40 297 3773
Fax: (+31) 40 297 3770

email: info@sagantec.com

www.sagantec.com

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